PREPARATION AND CHARACTERIZATION OF CELLULOSE ACETATE BUTYRATE/ORGANOCLAY NANOCOMPOSITE WITH ANTIMICROBIAL ACTIVITY

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Nowadays, several alternatives have been investigated to minimize the environmental impact of conventional polymers, including the use of biodegradable polymers. Compared to synthetic polymers, natural biopolymers as food packaging materials have the advantage of biodegradability, use of renewable resources and potential edibility; however, they have the disadvantage of poor mechanical and barrier properties. To overcome these issues, a new approach has been developed, which use hybrid materials consisting of polymers and layered silicates. On other hand, antimicrobial packaging is one of the biggest driving forces for innovation in food packaging due to the increasing demand, by consumers, for safe, high quality, minimally processed, and extended shelf-life of foods.

The main objective of this study was to determine the physical and antimicrobial properties of nanocomposites of cellulose acetate butyrate with antimicrobial compounds obtained by extrusion process. Nanocomposite films based on cellulose acetate butyrate (CAB) containing organoclay (Cloisite30B), plasticizer, and natural antimicrobial compounds were prepared by extrusion process and characterized by X-Ray diffraction, differential scanning calorimetry, tensile properties and antimicrobial activity against E. coli, L innocua and S. cerevisiae.

All nanocomposites obtained showed an increase of interlaminar distance due the intercalation of polymer inside the clay structure. Tensile strengths were not modified whereas elongation at break increased nearby 10-15 % depending on the antimicrobial and organoclay content. Addition of plasticizer and/or organoclay to the CAB affected cold crystallization and melting temperatures. Finally, nanocomposites showed at least 2 log cfu/ml reductions for microorganism studied.